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A STUDY OF THE CASES OF TABES DORSALIS IN PROF. M. ALLEN STARR'S CLINIC, COLUMBIA UNIVERSITY, FROM JANUARY, 1888, TO JANUARY, 1901.

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The total number of cases which have applied for examination and treatment in the Neurological Department of the Vanderbilt Clinic, since its opening in January, 1888, to January, 1901, is 23,834. Of this grand total, 11,271 were males, and 12,563 were females. Boys under 13 years of age are included in the total of females as they are treated in the female room. As the examinations of all these cases were made by experts, specialists in nervous diseases, the diagnoses are correct, and the accompanying figures should have some importance. Among these patients were 286 cases of tabes dorsalis, and, therefore, it is seen that this disease constitutes only 1.2 per cent. of the whole number of cases. Of these 286 cases of tabes, 242, or 84.6 per cent., were males, and 44, or 15.38 per cent., were females. This shows a greater frequency of the occurrence of the disease in males than in females in the proportion of 6.5 to 1. In an analysis of 111 cases of tabes in the Johns Hopkins Hospital, Thomas[1] found 97 males and 14 females, which give a proportion of 7 to 1, or 12.6 per cent. of female cases. Both of these proportions indicate the occurrence of the disease in females somewhat more frequently than the proportion given by Gowers,[2] which was 10 males to one female.

The relative frequency of the occurrence of tabes among nervous diseases in both males and females, is interesting as shown by the fact that only 242 out of 11,271 males, and only 44 out of 12,563 females were cases of tabes. In other words, only 2.147 per cent. of 11,271 cases of nervous diseases in males, and only 0.35 per cent. of 12,563 cases of nervous diseases in females were tabes dorsalis.

The age of onset was noted in all but 37 of the 286 cases. Referring to Table I., it will be seen that in 40.16 per cent. of those in which it was noted, the age of onset of the disease was between 30 and 40 years; in a little over 32 per cent. it was between 40 and 50 years; in 17.26 per cent. it was between 20 and 30 years, and in 10 per cent. it was over 50 years. But no cases are recorded in which the disease began after 60 years of age. Thirty-eight per cent. of Thomas' cases began between 30 and 40 years, 40 per cent. between 40 and 50 years, 14 per cent. after 50 years—one case as late as 66 years of age—and only 7 per cent. before 30 years. His youngest case was 25 years of age, and his oldest 66 years at the onset of the disease.

TABLE I. AGE AT ONSET.

Between 10 and 20 years,	1 case.
Between 20 and 30 years,	43 cases.
Between 30 and 40 years,	100 cases.
Between 40 and 50 years,	80 cases.
Between 50 and 60 years,	25 cases.
Not stated in	37 cases.

While there is still a difference of opinion as to the rôle which syphilis plays in the etiology of the disease, whether it plays a direct etiologic part or simply prepares the tissues for the onset of tabes by weakening them and bringing about a susceptibility to the disease, the weight of opinion leans toward the conclusion that tabes is a post-syphilitic disease. At any rate, there is no doubt but that syphilis is an important factor, either direct or indirect, in the causation of tabes. In our 286 cases a well-authenticated history of syphilis was present in 166 cases, or a little over 58 per cent., and was absolutely denied or absent in only 88 cases, or 30.77 per cent. In 32 cases, or a little over 11 per cent., there was some doubt about the occurrence of syphilis, either because the patient, while denying the disease, gave some history or presented some symptoms which made its occurrence more than probable, or because some indefinite history of a sore, or an eruption, etc., prevented the examiner from entirely ruling out the disease. Thus there was only 30.77 per cent. of these cases absolutely free from the presence or suspicion of syphilis. This gives about 70 per cent. of the cases as having, either positively or probably, had syphilis, which is a small percentage as compared with the results of the investigations of Fournier,[3] who found syphilis in 91.26 per cent.; Erb,[4] who found it in 88 per cent.; Rumpf,[5] who found it in 90 per cent.; Althaus,[6] who found it in 86.5 per cent.; Gowers,[7] who found it in 80 per cent.; Strümpell,[8] who noted it in 90 per cent. On the other hand, Thomas found positive syphilis in only 42.1 per cent. of his cases, and possible syphilis in 63.1 per cent. These latter figures are still smaller than the percentage presented here.

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[1] *Thomas, H. M.*—"An Analysis of the Cases of Tabes in the Johns Hopkins Hospital and Dispensary from Its Opening in May, 1889, to December, 1898." Bulletin of Johns Hopkins Hospital, Vol. 10, 1899, p. 51.

[2] *Gowers.*—"Diseases of the Nervous System." Vol. 1, p. 399.

In those cases in which syphilis had been undeniably present, it will be seen in Table II. that the time between the occurrence of the chancre and the first symptom of tabes noticed by the patient varied from one to forty years. This point was not recorded in 57 cases. In 11 cases, or 10 per cent., the first symptom was noted one year after the presence of the chancre. Gowers[9] says that the first symptom of tabes rarely appears within the first three years after the chancre. In one case it was not noticed until 40 years after the occurrence of the chancre, but in no other case was the time between the chancre and the first symptom more than 29 years. In two of the cases which Thomas reported the time between the chancre and the first symptom was 30 and 40 years respectively.

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[3] *Fournier.*—"De l'ataxie locomotrice d'origine syphilitique." Annales de dermatologie et de syphiligraphie, 2d Série, Tome iii, 1882, p. 19.

[4] *Erb.*—"Tabes und Syphilis." Centralblatt für die medicinischen Wissenschaften, 1881, xix., No. 11 u. 12.

[5] *Rumpf.*—"Syphilitischen Erkrankungen des Nervensystems." Wiesbaden 1887, p. 368.

[6] *Althaus.*—"Ueber Sclerose des Rückenmarks." Leipsig.

[7] *Gowers.*—"Diseases of the Nervous System." Vol. 1, p. 399.

[8] *Strümpell.*—"Text Book of General Medicine," 1889, p. 597.

TABLE II. TIME BETWEEN CHANCRE AND FIRST SYMPTOM.

1 year in 11 cases;	16 years in 3 cases;
2 years in 2 cases;	17 years in 3 cases;
3 years in 4 cases;	18 years in 9 cases;
4 years in 3 cases;	19 years in 1 case;
5 years in 6 cases;	20 years in 6 cases;
6 years in 4 cases;	22 years in 2 cases;
7 years in 3 cases;	23 years in 4 cases;
8 years in 9 cases;	24 years in 2 cases;
9 years in 4 cases;	27 years in 1 case;
10 years in 8 cases;	28 years in 2 cases;
11 years in 5 cases;	29 years in 3 cases;
12 years in 5 cases;	40 years in 1 case;
13 years in 3 cases;	Not stated, 57 cases.
14 years in 3 cases;	
15 years in 2 cases;	Total 166

Among the other conditions mentioned in these histories as possible etiologic factors are: alcoholism in 6 cases; exposure to heat and cold in 8 cases; sexual excess in one case; articular rheumatism in one case; miscarriages in 5 cases, and trauma in 4 cases. In almost all these cases, syphilis was also present. The trauma in one case consisted of a fracture of the pelvis and sacrum from a fall of twelve feet upon the buttocks. The miscarriages were probably all due to existing syphilis.

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[9] *Gowers.*—"Diseases of the Nervous System," Vol. 1, p. 400.

The duration of the disease (see Table III.), at the time the initial examination was made, was not known or ascertained in 57 cases, but in the others it varied from six months to 30 years. In 65 cases the disease had been present for one year, in 47 cases for 2 years, and in 32 cases for 3 years, when relief was sought at the Clinic. The exceedingly slow course of the disease in some cases is emphasized when it is remembered that all these patients, even those who had had the disease between 20 and 30 years, were able to walk to the Clinic.

TABLE III. DURATION OF THE DISEASE.

6 months in	4 cases;	10 years in	13 cases;
9 months in	1 case;	11 years in	1 case;
1 year in	65 cases;	12 years in	3 cases;
2 years in	47 cases;	15 years in	4 cases;
3 years in	32 cases;	16 years in	2 cases;
4 years in	12 cases;	18 years in	1 case;
5 years in	13 cases;	20 years in	1 case;
6 years in	12 cases;	21 years in	1 case;
7 years in	7 cases;	23 years in	1 case;
8 years in	3 cases;	27 years in	1 case;
9 years in	4 cases;	30 years in	1 case;
		Not stated in	57 cases.

There are three symptoms which, when all are present, establish a positive diagnosis of tabes. These are the absence of the knee-jerks, and the presence of the Argyll-Robertson pupils and of the lightning pains. The presence of any two of these symptoms makes the diagnosis of tabes probable, especially when either ataxia, or the Romberg symptom, is present also. That these symptoms are not always present in undoubted cases of tabes will be seen from the following figures. We will take up the symptoms of tabes in our 286 cases in the order of their importance from a diagnostic standpoint, and of their frequency.

While we find the knee-jerks typically absent in 95.2 per cent., or 258 of the 271 cases in which this symptom is recorded, we also come upon some interesting variations in the condition of this reflex. In three cases both knee-jerks were present and normal. In one case both knee-jerks were present but delayed in their action. Later, in this case, both knee-jerks were absolutely lost. In two cases both knee-jerks were only diminished in their activity. In one of these cases a later examination showed a complete absence of the knee-jerks. The right knee-jerk was normal and the left absent in 3 cases, and the left knee-jerk normal and the right absent in four cases. This condition indicates that only one-half of the cord was involved at the time of the examination. Thomas found the knee-jerks absent in both knees in only 81 per cent. of his cases. The action of the knee-jerks was diminished in six cases, normal in four, and not noted in 14 of his cases. Leimbach,[10] in a study of 400 cases, noted the absence of knee-jerks in 92 per cent., and a change in them in 4.25 per cent. Bernhardt,[11] in 46 cases in which this symptom was noted, found the knee-jerks absent in 44 cases, or 95.6 per cent., and present in two cases. This percentage is almost the same as that found in these 286 cases.

The arm-reflexes, the elbow- and wrist-jerks, were absent in 13 of our cases, but were present or not recorded in all the others. One of the cases in which the arm-reflexes were absent was one of cervical tabes with marked ataxia of the arms and no involvement whatever of the lower extremities. The condition of the plantar, the abdominal and cremasteric reflexes was mentioned in a few of the cases, but the number in which they were noted is so small that the figures are of no importance.

One of the cardinal symptoms of tabes is the condition of the pupils known as the Argyll-Robertson pupil, in which the pupil reacts to accommodation but not to light. That the absence of this symptom does not, however, preclude the diagnosis of tabes we find from the examination of the pupils of these 286 cases. The Argyll-Robertson pupil was present in both eyes in only 175 cases, or 61.18 per cent. It was present in two other cases in the left eye only, the pupil of the right eye in each case reacting normally. Neither pupil reacted at all, to either light or accommodation, in 15 cases, and in 26 cases both pupils reacted sluggishly only. The left pupil did not react at all, the right being normal, in 6 cases, and the right pupil reacted sluggishly only, while the left responded normally, in one case. These figures give a total of 78.67 per cent. of cases in which there were changes in pupillary reaction, which is much greater than the 70.25 per cent. found by Leimbach. Schaffer, in his new book on tabes, says that Gowers states that the Argyll-Robertson pupil is only present in those cases of tabes which have had syphilis. I have been unable to verify this reference, but in 20 consecutive cases, of those under consideration here, which have had no syphilis, the Argyll-Robertson pupil was present in each. There is no doubt but that, if this point were investigated in the remainder of the 88 cases in which syphilis was undoubtedly absent, the Argyll-Robertson pupil would be found in many more. At any rate, the fact that the Argyll-Robertson pupil was present in 20 of the 88 cases, in which syphilis was absolutely denied, refutes the statement credited to Gowers. Of the other eye symptoms noted, nystagmus was present in 7 cases, or 2.44 per cent. Strabismus was present in 34 cases, and other ocular paralyses, including diplopia, were noted in 58 cases. Among this latter number are undoubtedly classed some cases of strabismus also.

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[10] *Leimbach.*—"Statistisches zur Symptomatologie der Tabes dorsalis." Deutsche Zeitschrift für Nervenheilkunde, Bd. vii., Abth. 5 u. 6, 1895, p. 493.

[11] *Bernhardt.*—"Zur Pathologie der Tabes." Virchow's Arch., Bd. lxxxiv., i., p. 1, 1881.

And "Ueber das Vorkommen von Neuritis optica bei Tabes." Berlin. klin. Wochenschrift, No. 28, p. 603, 1895.

Optic atrophy, either well-established or beginning, was found in 25 cases. In one case, that of a colored man, it came on as the first and only symptom except the blindness caused by it, and the absence of the knee-jerks. Eleven cases suffered from blindness. There is a great variation in the percentage of optic atrophy found by different investigators in cases of tabes. Von Grosz[12] found it present in 88 per cent.

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[12] *Von Grosz.*—"Die Symptome der Tabes dorsalis am Auge." Referat in Centralbl. f. prakt. Augenheilkunde, p. 181, 1896.

of his cases, Berger[13] in 46 per cent., Dillman[14] in 42 per cent., Marina[15] in 12 per cent., Bernhardt in 10.3 per cent., Thomas in 10 per cent., and Leimbach in 6.75 per cent. The proportion of optic atrophy among the cases now under consideration was 8.74 per cent., which it appears is next to the lowest percentage found by the above investigators. In 21 cases of tabes previously studied by the present writer[16] five were blind, which gives nearly 24 per cent. of complete optic atrophy. Among these 21 cases there were also six which showed changes in the optic nerve indicating a beginning atrophy. If we add these latter cases to those of complete optic atrophy, it will give us the presence of optic atrophy in 52.38 per cent. of these 21 cases. But these cases were most of them in advanced stages of the disease, confined to a hospital, and therefore one might call them selected cases.

Now, if we add together the cases studied by von Grosz, Berger, Bernhardt, Leimbach, Thomas, and myself, we have 1088 cases of tabes, and in 222 of these optic nerve atrophy was present. This gives us a percentage of 20.4 for the occurrence of optic nerve atrophy in these cases. This percentage is rather interesting as the number of cases is so large and perhaps comes near the truth of the matter. In the light of these figures, it seems probable that optic nerve atrophy does not occur as frequently in tabes as some of the high percentages would lead us to believe, nor as infrequently as the low ones would indicate. In considering the effect of optic atrophy upon the progress of the disease Benedict[17] says that all symptoms, even after they have attained a high degree, *retrograde* as soon as optic atrophy appears. He says he has never known an exception to this rule. This point has not been followed up in the histories of our cases with optic atrophy, but it is known to the writer that in one case, that of the colored man whose first symptom was blindness due to optic atrophy, there has been no further advance of the disease. The only symptoms he has ever presented have been the blindness due to optic atrophy and a loss of knee-jerks. The two patients of Bernhardt, in whom the knee-jerks were present, had optic atrophy as the first symptom, but whether the other symptoms of tabes were held in check in these cases is not known.

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[13] *Berger.*—"Die Sehstörungen bei Tabes dorsalis und Versuch einer Einheitlichen Erklärung des Symptomen-Complexes der Tabes." Arch. f. Augenheilkunde, Bd. xix., pp. 305 u. 391, 1888.

[14] *Dillman.*—"Ueber tabische Augensymptome und ihre diagnostische Bedeutung unter gleichzeitiger Berucksichtigung der Tabes-Syphilis Frage, nach dem Material der Schaeler'schen Augenklinik in Berlin." Dissertation, 1889.

[15] *Marina.*—"Ueber Multiple Augenmuskellähmungen." Leipsic und Vienna, 1896.

[16] *Bonar, A. B.*—"Sensory Disturbances in Locomotor Ataxia. A Study of the Localization of Anesthetic Areas as an Early Symptom." N. Y. Medical Record, Vol. 51, 1897, p. 721.

[17] *Benedict.*—"Ueber die Prognose und Therapie der Tabes." Weiner med. Presse, No. 34, 1887.

The symptom which is often the first noticed by the patient and is usually the one about which they complain the most, is pain. The sharp, lightning or lancinating pains of tabes are characteristic of the disease, and are almost invariably present at some time during its course. In these 286 cases pains were present in the legs in 186 cases, or 65 per cent.; in the thighs in 14 cases; in the trunk in 37 cases, or nearly 13 per cent.; in the arms in 20 cases, and in 2 cases they were general. Pains were also present in 37 cases in which their location was not stated. In many of the above cases the pains occurred at the same time in two or more locations, as in the thighs and legs, or the trunk and legs, or the trunk, arms and legs. Leimbach found that 88.25 per cent. of his 400 cases had pains in the legs, and Bernhardt noted them in 79.5 per cent. of his cases. If, to our 186 cases in which pains in the legs are definitely noted, we add the 2 cases in which they were described as general, and the 37 cases in which the location of the pains was not noted, in both of which latter groups the legs were in all probability the parts affected, we find that 78.67 per cent. of the 286 cases had pains in the legs. This is very near Bernhardt's, and comes somewhat nearer Leimbach's percentage and probably nearer the truth. Thomas found pains in the legs had occurred in only 60 of his cases or about 54 per cent.

The Romberg symptom (a swaying of the body when standing with the eyes closed) was present in 226 cases, or 79 per cent. This proportion is about the same as in the cases of Thomas, who found this symptom present in 76.6 per cent., but it is smaller than in the cases of Leimbach, who noted it in 88.75 per cent.

Ataxia was present in the legs in 202 cases, or 70.62 per cent., which is about the same frequency as found by other observers, except Bernhardt, who found this symptom present in 94.1 per cent. of 51 cases. Ataxia was also present in the arms in 22 of our cases.

At one time or another, but usually in the early stages of the disease, 139 cases, or 48.6 per cent., experienced the girdle sensation or feeling of constriction around the waist or trunk, and 5 cases had at times a feeling of tightness around the knees or thighs similar to the girdle sensation. In his cases Leimbach found this symptom present in only 31 per cent., and Thomas noted it in only 24 per cent. of his, which percentages are much smaller that that noted by the present observer.

Objective disturbances of sensation, of which the patient is usually ignorant, were found in all those cases in which this symptom was sought. Anesthesia to touch, or to pain, or to both, on the trunk and legs was the most common disturbance. Besides this, in different patients, there were various combinations of anesthesia, analgesia, hypesthesia, hypalgesia, hyperesthesia, hyperalgesia, and delayed sensation to touch, pain, heat, and cold. The areas of anesthesia on the legs and arms were usually of the stocking and gauntlet type, and the sensations of touch and pain were the ones most commonly affected. On the trunk the disturbance usually consisted of bands of anesthesia to touch only, of varying width and usually extending from the median towards the axillary line in either the front or back, or both. Sometimes two or more parallel bands were found, indicating the simultaneous invasion of the cord at several distinct levels. The frequency of this trunk anesthesia in tabes is shown by the symptom of the disease. This proportion of crises in these results of the investigations of Hitzig,[18] who first called attention to trunk anesthesia in this disease, and who believes that it is practically always present; Laehr,[19] who found anesthetic areas on the trunk in 55 out of 60 cases of tabes, or 91.66 per cent.; Patrick,[20] who found this symptom present in 17 out of 20 cases of tabes, and who says that 85 per cent. is a very conservative estimate of its frequency. In my study, "Sensory Disturbances in Locomotor Ataxia." Etc., previously referred to,[16] careful and repeated examinations in twenty-one cases demonstrated the presence of disturbances of sensation of some kind in some part of the body in 86 per cent., that is, in all except three cases. Trunk anesthesia, however, was not found quite so frequently in these cases as Laehr, Hitzig and Patrick found it in theirs, for this symptom was found in only 15, or 71.43 per cent., of the 21 cases.

Paresthesia and numbness were complained of in 54.54 per cent., or 156 cases. In Leimbach's cases paresthesia was present in the legs in 64.5 per cent., and in the hands and forearms in 16.5 per cent., while Thomas found numbness recorded as complained of in some part of the body in a little over 40 per cent. of his cases. As the number of cases from which Thomas' proportion was obtained is much smaller than either Leimbach's or those now under consideration, the much greater percentage of cases with numbness found by Leimbach and myself probably indicates the frequency of this symptom much more accurately.

Crises occurred in 16.78 per cent of these 286 cases. These crises were gastric in character in 36 cases, intestinal or diarrheal in 5 cases, "simulating migraine" in one case, coughing (probably laryngeal) in one case, laryngeal in 4 cases, and in one case a crisis is mentioned, but its nature is not stated. In a number of cases a gastric crisis was the first symptom of the disease. This proportion of crises in these cases is much greater than that found by Leimbach (5.25 per cent.) in his cases, or by Thomas (10.8 per cent) in his. Thomas noted 9 gastric, 2 laryngeal and one rectal crisis in his 111 cases. It is evident from these figures that gastric crises are the most common and that laryngeal or rectal crises are next in frequency.

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[18] *Hitzig.*—"Ueber traumatische Tabes und die Pathogenese der Tabes im Allgemein." Berlin, 1894.

[19] *Laehr.*—"Ueber Sensibilitatsstörungen bei Tabes dorsalis und ihre Localization." Archiv für Psychiatrie, xxvii., p. 688, 1895.

[20] *Patrick, H. T.*—"Anesthesia of the Trunk in Locomotor Ataxia." New York Medical Journal, Feb. 6, 1897.

One of the most common symptoms, of which those afflicted with this disease complain, is vesical disturbance. In 62.23 per cent., or 178 cases, there was bladder trouble, more often incontinence than retention of the urine. This vesical disturbance occurred most frequently during the early years of the disease. Incontinence sometimes changed to retention and *vice versa*, or the two conditions alternated for years. In 83 cases in which this symptom was sought for, Thomas found it present in 65 per cent., which nearly agrees with the percentage here stated. Leimbach, however, noted bladder trouble in 80.5 per cent. of his 400 cases, and Bernhardt in 74.07 per cent. of his 58 cases.

Sexual weakness, consisting of loss of desire or of sexual power, or both, was present in 17, or 6 per cent., of the 286 cases. In some cases the desire and power returned after a variable length of time. This very low percentage of weakness or loss of sexual desire and power is remarkable, and a failure to interrogate all the patients for this symptom is probably the cause, for Leimbach found it present in 58.25 per cent. of his 400 cases, Bernhardt in 43.7 per cent. of 49 cases, and Thomas in 84 per cent. of the 75 cases in which it was sought.

Eighty-one cases, or 28.32 per cent., suffered from a loss of muscular sense. This loss was so marked in some cases that the patient would lose his legs in bed or when sitting at a table. In very few of the cases was there a loss of muscular sense in the arms and hands. In these cases it consisted of an inability to differentiate between objects of the same size and shape but of different weights (astereognosis). An examination of 44 of Thomas' cases gave a loss of muscular sense in 38, or 86 per cent. Undoubtedly many of these 286 cases under consideration here were not examined for this symptom, which will explain the small number in which it is reported.

There were trophic disturbances of the joints in 6 cases. Three of these were diagnosed as "Charcot joints," the knees being the parts affected. In the other three cases the condition recorded, "a swelling of the knee," was undoubtedly a Charcot joint in each. In fact, in two of these latter, a subsequent addition to the history states that the swelling had become a typical Charcot joint. Leimbach found arthropathies in only 1.75 per cent. of his cases, which is slightly less than the number, 2.1 per cent., found in these cases. Thomas reported five typical Charcot joints, and suspicious enlargement of the joint in three other cases, one of which latter developed into an undoubted tabetic arthropathy of the right thumb. Of the 5 Charcot joints noted by Thomas, 3 were located in the knee, one in the shoulder, and one in the elbow. The 6 arthropathies here reported affected the knee-joint in each case.

Perforating ulcers of the feet occurred in four cases. One of these patients had 3 ulcers at one time on one foot. Thomas reported the occurrence of perforating ulcers five times in his 111 cases.

Muscular atrophy was observed in three cases in the legs, and in one case in the arms. In two cases a "weakness in the peroneal group" was reported. Several patients complained of a general weakness, and of a loss of weight.

The other less common symptoms observed were a tremor of the face and tongue in two cases, and of the hands in three cases; anosmia (complete), in three cases; loss of taste in one case; deafness in two cases, and vertigo in one case.

For convenience in reference and comparison we will tabulate the above symptoms in the order of their frequency, giving the percentage of the cases in which each symptom was noted:—

	PER CENT.
Loss of knee-jerks	95.2
Changes in knee-jerks	3.69

Romberg symptom	79.02
Change in pupillary reaction	78.67
Pains in the legs	78.67
Ataxia in legs	70.62
Vesical disturbance	62.23
Paresthesia and numbness	54.54
Girdle sensation	48.6
Loss of muscular sense	28.32
Crises	16.78
Pains in trunk	12.93
Optic nerve atrophy	8.74
Ataxia in arms	7.69
Pains in arms	6.99
Loss or diminution of sexual instinct	6.
Pains in thighs	4.89
Ocular paralyses (strabismus, diplopia, etc.)	3.21
Nystagmus	2.44
Arthropathies	2.09
Constriction around legs or thighs	1.74
Tremors	1.74
Perforating ulcers of foot	1.39
Muscular atrophy	1.39
Anosmia	1.04
Deafness	0.69
Vertigo	0.34
Loss of taste	0.34

Inasmuch as the number of cases here studied is so large, the percentages in the above table are of interest and value. It is only by the gathering together of large numbers of cases that satisfactory deductions can be made from the percentages obtained. The symptoms of tabes are practically never all present in one patient. They occur in such a great variety of combinations, that it is only by studying a large number of cases that we can arrive at any true conclusion concerning the frequency, duration, and importance of the different symptoms. It is with the hope that the above cases will prove of more than passing interest that they are presented.

It is to be regretted that one or two of the symptoms were not sought for, or at least not recorded, in a few of the cases.

I wish to thank Prof. M. Allen Starr for his kind permission to publish these cases.